2131

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

John Aram SAFA

Art Unit: 2131

Application No: 09/905,573

Examiner:

Filed: July 13, 2001

For: COMPUTER SOFTWARE INSTALLATION



TRANSMITTAL OF CERTIFIED COPY

Commissioner for Patents
Washington, D.C. 20231

Sir:

This application claims priority of United Kingdom Application No. 0017478.9 filed July 18, 2000. A certified copy of the United Kingdom patent application is transmitted herewith in order to complete the claim for priority.

Respectfully submitted,

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Docket: SWIN 2275

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Patents Form 1/77

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The Patent Office

1/77

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18 JUL 2000
NEWPORT

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*(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)*

18 JUL 2000

The Patent Office

Cardiff Road
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18JUL00 E553479-2 000353
P01/7700 0.00-0017478.9

1. Your reference MPS/7549

2. Patent application number
*(The Patent Office will fill in this part)* **0017478.9**

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Bit Arts Limited
Vernon House, 18 Friar Lane,
Nottingham, NG1 6DQ.

Patents ADP number *(if you know it)* 7942610001

If the applicant is a corporate body, give the country/state of its incorporation United Kingdom

4. Title of the invention

Computer Software Installation

5. Name of your agent *(if you have one)*

Swindell & Pearson

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

48 Friar Gate,
Derby DE1 1GY

Patents ADP number *(if you know it)* 00001578001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

| Country | Priority application number *(if you know it)* | Date of filing *(day / month / year)* |
|---|---|---|

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

| Number of earlier application | Date of filing *(day / month / year)* |
|---|---|

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

*a) any applicant named in part 3 is not an inventor, or*
*b) there is an inventor who is not named as an applicant, or*
*c) any named applicant is a corporate body.*
*See note (d))*

Yes

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9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

| | |
|---|---|
| Continuation sheets of this form | 0 |
| Description | 7 |
| Claim(s) | 0 |
| Abstract | 0 |
| Drawing(s) | 2 x2 |

10. If you are also filing any of the following, state how many against each item.

| | |
|---|---|
| Priority documents | |
| Translations of priority documents | |
| Statement of inventorship and right to grant of a patent *(Patents Form 7/77)* | |
| Request for preliminary examination and search *(Patents Form 9/77)* | |
| Request for substantive examination *(Patents Form 10/77)* | |
| Any other documents *(please specify)* | |

11. I/We request the grant of a patent on the basis of this application.

Signature Swindell & Pearson Date 17/07/2000

Swindell & Pearson

12. Name and daytime telephone number of person to contact in the United Kingdom: Mr. M.P. Skinner - 01332 367051

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c) *If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.*

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# Computer Software Installation

The present invention relates to computer software and in particular, to arrangements for installation of computer software.

Modern computer software, particularly applications such as spreadsheets and word processors, is highly complex and makes use of many sub-routines which are called when required by the main executable program. In many cases, these sub-routines may also be required by other applications. For example, a PRINT sub-routine, or sub-routines for FILE OPEN or FILE CLOSE may be usable by a variety of different applications. It has therefore been proposed that in order to save space within system memory, these sub-routines should be shared, where possible. Thus, when installing a new application, it has been proposed that the new application checks the resources already available within the system and makes use of those, where possible. Thus, in the event that a new application requires a later version of a sub-routine than it finds is available within the system, the later version will be installed at the time the new application is installed.

This leads to conflicts between applications. An application already on the system may require an earlier version of the sub-routine which has now been overwritten by the later version required by the new application. This is likely to cause operation of the existing application to become unpredictable or impossible.

The present invention seeks to address these difficulties.

The inventions provides computer software comprising an executable program of the type which requires access to at least one sub-routine during execution, the software incorporating the or each of the sub-routines in encrypted form, and further incorporating a decryption routine operable to convert the encrypted sub-routines to an executable form, at least when access is required.

Preferably the decryption routine is executed whenever the program is executed, whereby to recreate the sub-routines in executable form on each occasion. The decryption routine is preferably operable to detect the presence of a sub-routine already available within a system running the software, and to cause the executable program to use a sub-routine already available.

Preferably the decryption routine creates an address table accessible by the program for locating sub-routines for access. The decryption routine may be operable to incorporate within the address table an address for a sub-routine already available, whereby decryption of a further copy of the sub-routine is not required.

The decryption routine is preferably operable to discriminate between different versions of a sub-routine, whereby to decrypt an encrypted version in the event that only a different version is available within the system.

The software preferably further incorporates an encrypted copy of the executable program, the decryption routine being operable to decrypt an executable copy of the program. The decryption routine is preferably operable to decrypt a copy of the executable program in the event that an unencrypted copy contained within the software is detected as being corrupt.

Preferably encryption and decryption include or consist of compression or decompression techniques.

The invention also provides a data storage device containing computer software as aforesaid.

The invention also provides a computer system comprising processing means operable to execute software, and at least one piece of computer software as aforesaid.

The invention also provides a method of installing a piece of computer

software, comprising:

1. Installing an executable program of the type which requires access to at least one sub-routine during execution:

2. Decrypting an encrypted copy of the sub-routine; and

3. Installing the decrypted copy for access by the executable program.

Preferably the steps of decrypting and installing are executed on each occasion the executable program is required to be executed.

The method may further comprise the steps of identifying any sub-routines already installed and available to the executable program, and decrypting and installing only the or any required sub-routine which is not so available. The step of identifying sub-routines already available preferably includes discriminating between different versions of a sub-routine, whereby to decrypt an encrypted version in the event that only a different version is already available.

The method may further comprise the step of assessing the executable program for corruption, and decrypting and installing a further copy of the executable program for use in the event that corruption is detected.

Preferably encryption and decryption includes or consists of compression or decompression techniques.

Examples of the present invention will now be described in more detail, by way of example only, with reference to the drawings, in which;

Fig. 1 is a schematic simplified diagram of a data processing device with which the present invention may be implemented;

Fig. 2 illustrates RAM with an application installed in accordance with a previous proposal; and

Fig.3. illustrates the steps for installing an application in RAM in accordance with the present invention.

Before describing arrangements for installing software, it is first helpful to describe the basic components of a data processing system with which the invention can be implemented. Fig. 1 illustrates a computer system 1 which contains a processor 2 to which input/output devices 3 are connected. The processor 2 is also provided with random access memory (RAM) 4 for use during processing. Additional memory capacity is provided at 5, for instance by a hard drive.

It is common practice for a software application to be stored on the drive 5 until needed, and then to be compiled into a machine code version which is installed on the RAM 4, for speed of access and processing by the processor 2.

Fig 2. illustrates a section of RAM 10 in which an application (such as a word-processing application) has been installed for use by a processor of a device of the type shown in Fig. 1. The drawing illustrates various components of the application, in highly simplified, schematic form. These include a loader 12, which is a block of code to implement initial operation of the application when first opened. The main body of the program is installed in the RAM 10 at 14. The program 14 will require access to files containing sub-routines, as described above. These are commonly called .DLL files and will be shared by various applications. Accordingly, .DLL files 16 are illustrated in the drawing as being elsewhere in the RAM 10. A region 18 between the program 14 and the .DLL files 16 is free for other use, such as the installation of another application.

The application also includes an import address table (IAT) 20 which consists of a table identifying the location of .DLL files 16 so that the program

14 may access those files 16 when required, by looking up their location in the IAT 20.

Fig. 2 illustrates the manner in which an application can be loaded in accordance with the present invention.

Initially, the RAM 10 is loaded to the condition illustrated in Fig. 2a. The loader module 12 is in position and corresponds with the loader 12 of Fig. 1. The program 14 is also installed at the position corresponding with the installation in Fig. 1. However, it is to be noted in Fig. 2a that the region of memory used for the IAT 20 in Fig. 1 is empty in Fig. 2a.

In accordance with the invention, an additional block of executable code, called an ENGINE 22 is installed in the RAM 10 below the program 14, i.e. in part of the region 18. Other files 24 are associated with the ENGINE 22. These files are encrypted versions of the .DLL files 16 of Fig. 1. Encryption may be by compression or a more secure encryption technique. The files 24 are identified within parentheses in Fig. 2a, to indicate schematically their encrypted nature.

In Fig. 2a, the RAM 10 is illustrated as incorporating .DLL1, corresponding with .DLL1 installed in Fig. 1, but .DLL2 is not shown in Fig. 2a. This corresponds with the situation if .DLL2 is not available within the system, or is not available in the appropriate version.

Fig. 2b illustrates the changes which take place within the RAM 10 when the application is run. As part of the initialisation of the application, the loader 12 causes the ENGINE 22 to run. The ENGINE 22 provides two functions. First, the ENGINE 22 will look through the system to identify any resources required by the application and already available within the system. In this simple example, it will be apparent that the sub-routine .DLL1 is already in the RAM 10 and is thus available to the program 14. The ENGINE 22 therefore makes the appropriate entry in the IAT 20 to identify the sub-routine .DLL1 and its location.

Secondly, the ENGINE 22 seeks to identify any required sub-routine which is not already available within the system, or is not available in the appropriate version. In this simple example, sub-routine .DLL2 is not available initially, in the situation pertaining in Fig. 2a. The ENGINE 22 therefore accesses the encrypted file shown as (.DLL2) and then operates to decrypt a copy of .DLL2. The decrypted copy is then installed to be available to the program 14. Again, the ENGINE 22 makes an appropriate entry in the IAT 20 to identify the presence and location of file .DLL2.

Thus, after operation of the ENGINE 22 as described, the installation of the application has become equivalent to the installation shown in Fig. 1, there being a loader 12, program 14, IAT 20 for directing the program to sub-routines, and a full set of DLL sub-routines.

Incorporating the ENGINE 22 and the encrypted (.DLL) files within the software first installed in the RAM 10 allows a useful technical effect to be achieved, as follows. The application becomes self-contained, in that it carries with it a full set of sub-routines required for its operation. These are preferably in compressed form to save space, and may be further encrypted for security. They can be installed as described above in the event that they are not already available, or are not available in the correct version. Furthermore, they will be installed, as required, on each occasion the application is run. In consequence, correct operation of the application will not be affected by installation or operation of a different application, however aggressively that other application might modify, replace or over-write shared .DLL files. Any shared files which have ceased to be available as a result of the activity of another application will be restored from the encrypted (.DLL) files when the application next runs.

Operation of the ENGINE 22 and the encrypted (.DLL) files also provides a degree of protection against virus attack or other corruption. The ENGINE 22 can be programmed to make an assessment of corruption of sub-routines, installing fresh, unencrypted copies from the (.DLL) files, in the event that any corruption is found or suspected.

In a further extension of the invention, the ENGINE 22 may be provided with an encrypted copy of the main program 14 again with the intention that in the event of any corruption being detected or suspected within the main program 14, a full, fresh copy of the program 14 can be decrypted and installed.

It will be apparent from the above description that many variations and modifications can be made to the arrangements described above, without departing from the scope of the present invention. In particular, it will be apparent to the skilled man that the techniques can be implemented in a very wide variety of languages, and using any of a wide variety of encryption, decryption compression or decompression techniques.

Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

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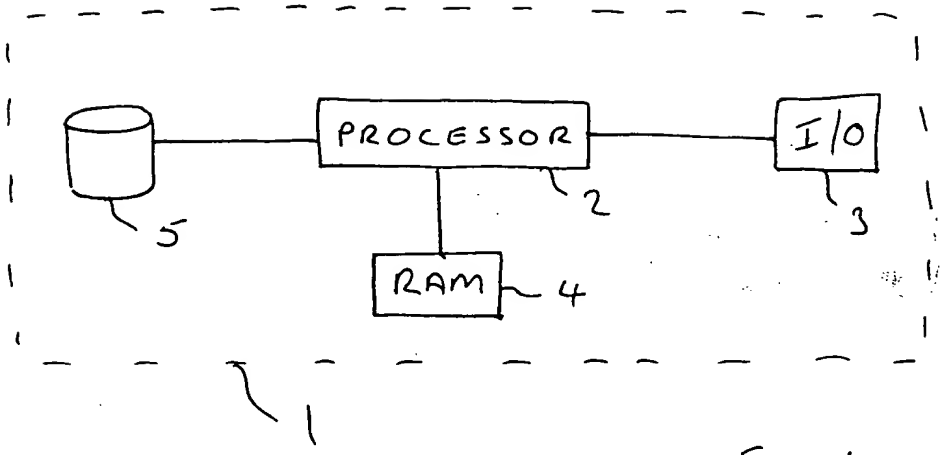


FIG. 1

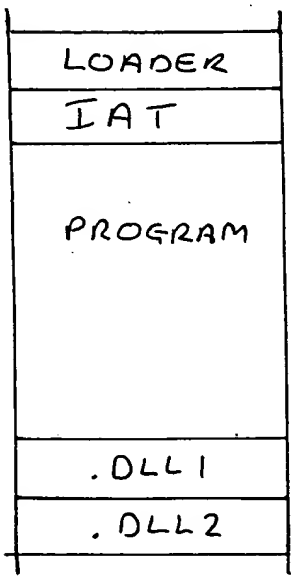


FIG 2

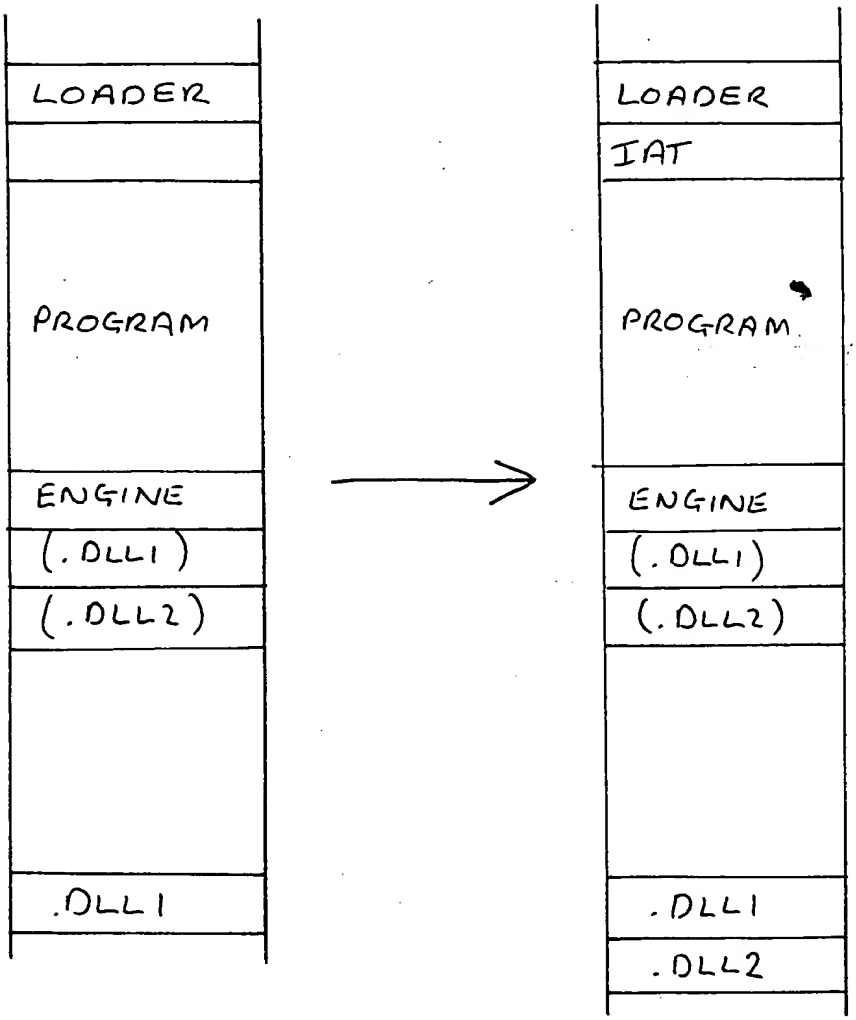
LOADER
PROGRAM
ENGINE
(.DLL1)
(.DLL2)
.DLL1
LOADER
IAT
PROGRAM
ENGINE
(.DLL1)
(.DLL2)
.DLL1
.DLL2

Fig 3a

Fig 3b